

ABSTRACT

A semiconductor device includes a trench gate IGBT and a MISFET. The IGBT has an auxiliary base layer which is formed in an arbitrary region between two adjacent trenches and is insulated from an emitter electrode of the IGBT, and a carrier discharge electrode which contacts a surface of the auxiliary base layer. The MISFET is connected to the emitter electrode and the carrier discharge electrode and turned on upon turning off the IGBT. Upon turning off the IGBT, the accumulated carriers below the auxiliary base layer are discharged to the emitter electrode via the auxiliary base layer, the carrier discharge electrode, and the MISFET. This promotes the carrier discharge effect in turn-off, realizing a high-speed turn-off characteristic.